NASA PM Challenge 2009

Assessing Schedule Health - STAT!

Glen Harrison & Ken Poole
NASA/MSFC/CS40 PP&A Team
256-544-3385 & 256-544-2419

Agenda

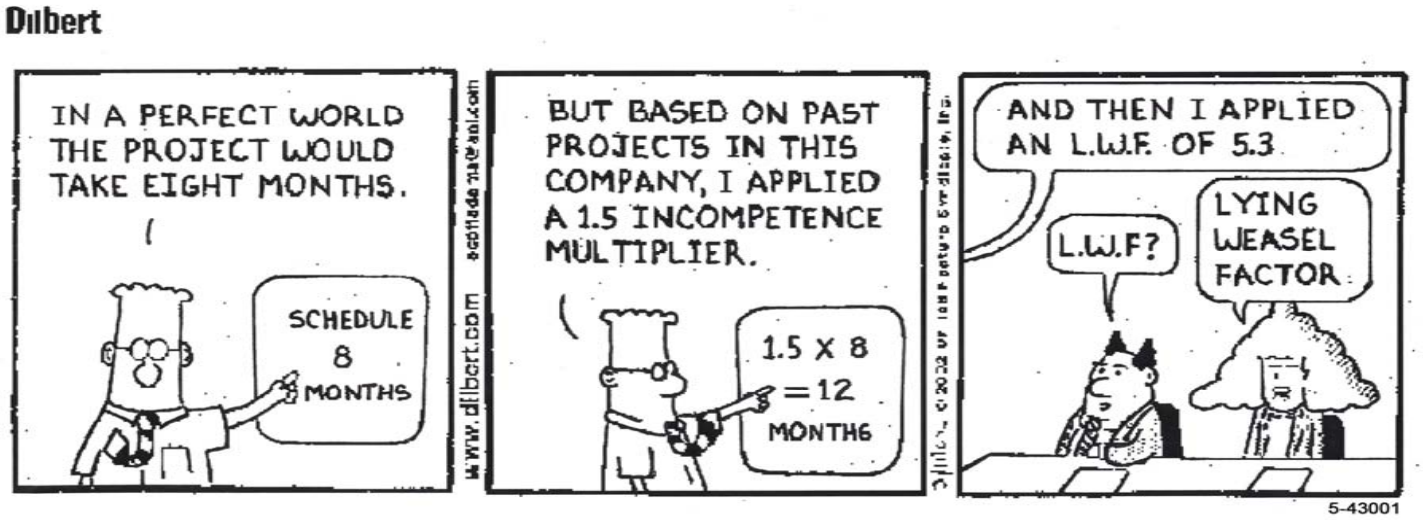
1. Purpose
2. Background
3. Tool Description
4. Key Benefits
5. Output Examples
6. Demonstration

Purpose

- Introduce the NASA developed Schedule Test and Assessment Tool (STAT)
  - Capabilities
  - Benefits
- Enhance audience awareness of the importance of determining schedule credibility

Background

Why Assess Schedules?



Because…

The schedule may not reflect an accurate and truthful picture (the plan and/or status may be inaccurate or the scheduling process may be flawed)

Ignorance or Deceit?

Background (Cont.)

Why Assess Schedules?

Other Considerations…

1. **Schedule may not reflect the total scope of work**
2. **An inaccurate model of the planned implementation provides an incorrect basis for resource planning**
3. **Schedule may not identify the critical path**
4. **Schedule may not be integrated**
   - **Internally (task interdependencies)**
   - **Externally (other NASA Centers, contractor schedules, international partner or university schedules, etc.)**
5. **Improves internal schedule development & maintenance**
6. **Improves/validates Performance Measurement Baseline**
7. **Heightened interest by DCMA in schedule credibility**

Background (Cont.)

Identify Needs

Recognized need for improvements to processes/tools for project schedule development, assessment, analysis, and reporting.

Support

Assists Projects in Schedule Development

Improves & Validates On-going Schedule Credibility

Automate

Increased Efficiency in Manpower and Time

Quick-Turnaround Assessments

Increased Accuracy in Data

Report

Detailed, Intermediate and Executive Level Reporting

Combination of Objective and Subjective Reporting

Assess

Schedule Assessment for Internal and External Schedules

Objective Metrics to Quantify Schedule Problems

Background (Cont.)

Objective IMS Credibility Indicators

How Many or What Percentage of …

1. Tasks/milestones with no predecessors?
2. Tasks/milestones with no successors?
3. Tasks with no “finish” successors assigned?
4. Imposed task/milestone constraints (or deadlines) within schedule?
5. Tasks/milestones with missing, inaccurate, or out-of-date status?
6. Summary tasks with interdependencies assigned?
7. Tasks marked as milestones?
8. Task/milestone dates are baselined?
9. Tasks/milestones that have very little Total Slack?
10. Tasks/milestones have Total Slack values that are too high?
11. Tasks with “estimated” durations? (MSP default or placeholder durations)
12. Major milestones have slipped?
13. Monthly baseline completions are missed and by how much?
14. Quantity of SS & FF logic relationships are used?

Subjective IMS Credibility Indicators

1. Work-off trends (past actuals vs. projected plan)
2. Low “Slack” analysis
3. Task duration profile

Tool Description

- COM Add-in for Microsoft Project (.NET 2.0)
- Produces Microsoft Excel Charts and Graphs
- Wizard Interface used to automate process

Schedule Test & Assessment Tool

Health Check | **Trend Analysis** | **Reporting**

Integrity & Health Indicators

- Current Status Date
- Remaining Duration
- Missing Predecessors
- Missing Successors
- Quantity of Constraints
- Missing Status
- Completion Stats
- High/Low Float Stats

Performance History & Future

- Historical completion rates
- Credibility of planned completion rates
- Indicates work "bow-wave"
- Indicates baseline credibility

Assessment Reporting

- Detailed Reports
- Analyst summary report
- Mgmt overview report

Key Benefits

1. Efficient use of manpower
2. Enhance schedule quality
3. Timely schedule analysis
4. Objective schedule assessment
5. Easy to use and understand
6. Prerequisite to risk assessment

Output Examples

Schedule Health Check

CS40 Schedule Health Check

Project Name: Project XYZ IMS 1.19a.mpp

Overall Project Health Status Indicator Y R

Check for Improvements

Schedule Status

Description	Current	Previous	Change (C-P)	
Current Start (**Note:** earliest activity Early Start Date)	4/5/2006	4/5/2006		
Current Finish (**Note:** latest activity Early Finish Date)	7/27/2009	7/5/2009	22	0%
Approximate Remaining Work Days	684	668	16	2%
Is this schedule externally linked to other schedules?	N	N		
Status Date	10/31/2006	8/30/2006	63	

Is the Status Date Current?

Task and Milestone Count *(Note: These counts exclude summary tasks)*

Description	Count	% of Total	Count	% of Total	Change (C-P)	
Total Tasks and Milestones	3057		3021		36	
Completed Tasks and Milestones	501	16%	387	13%	114	4%
To Go Tasks and Milestones	2556	84%	2634	87%	-78	-4%

Missing Interdependencies & Number of Constraints

Logic *(Note: These counts exclude summary and started/completed tasks)*

Tasks and Milestones Without Predecessors	170	7%	Y	290	11%	R	120	-4%
Tasks and Milestones Without Successors	393	15%	R	425	16%	R	32	-1%
Constraints (Note: other than ASAP including deadlines)	235	9%	G	403	15%	R	168	-6%
Summaries with Logic Ties (see note below)	5	0%	G	8	0%	G	3	0%
Tasks and Milestones Needing Updates	105	4%	Y	235	9%	R	130	-5%
Actuals after Status Date	40	2%	Y	52	2%	Y	12	0%
Tasks marked as Milestones (Note: having a duration of > 0)	0	0%	G	3	0%	Y	3	0%

Incorrect Status

Note: *The summaries with logic ties number is calculated as a percentage of tasks and milestones.*

Additional Key Indicators

Additional Schedule Information

Tasks with No Finish Ties	17	1%	25	1%		
Recurring Tasks	33	1%	38	1%		
Tasks and Milestones with Estimated Duration	1	0%	0	0%		
Schedule traceable to WBS (Y/N)	Y		Y			
Realistic Critical Path(s) (Y/N)	N		N			
Schedule Baselined Tasks	2783	91%	2569	85%		
Resource Loaded (Y/N)	Partially		N			
Tasks and Milestones with 10 days or less Total Float	724	28%	1533	58%	-809	-30%
Tasks with Total Float > 25% of remaining duration	793	31%	910	35%	-117	-4%

Schedule Health Check (cont'd.)

CS40 Schedule Health Check

Project Name: Project XYZ IMS 1.19a.mpp

Overall Project Health Status Indicator: Y R

Schedule Status

Description	Current	Previous	Change (C-P)	
Current Start (Note: earliest activity Early Start Date)	4/5/2006	4/5/2006		
Current Finish (Note: latest activity Early Finish Date)	7/27/2009	7/5/2009	22	0%
Approximate Remaining Work Days	684	668	16	2%
Is this schedule externally linked to other schedules?	N	N		
Status Date	10/31/2006			

Task and Milestone Count (Note: These counts exclude summary tasks)

Description	Count	% of Total	Cou
Total Tasks and Milestones	3057		302
Completed Tasks and Milestones	501	16%	387
To Go Tasks and Milestones	2556	84%	263

Logic (Note: These counts exclude summary and started/completed tasks)

Tasks and Milestones Without Predecessors	170	7%	Y	290
Tasks and Milestones Without Successors	393	15%	R	425
Constraints (Note: other than ASAP including deadlines)	235	9%	G	403
Summaries with Logic Ties (see note below)	5	0%	G	8
Tasks and Milestones Needing Updates	105	4%	Y	235
Actuals after Status Date	40	2%	Y	52
Tasks marked as Milestones (Note: having a duration of > 0)	0	0%	G	3

Note: The summaries with logic ties number is calculated as a percentage of tasks and milestones.

Additional Schedule Information

Tasks with No Finish Ties	17	1%	25	1%
Recurring Tasks	33	1%	38	1%
Tasks and Milestones with Estimated Duration	1	0%	0	0%
Schedule traceable to WBS (Y/N)	Y		Y	
Realistic Critical Path(s) (Y/N)	N		N	
Schedule Baselined Tasks	2783	91%	2569	85%
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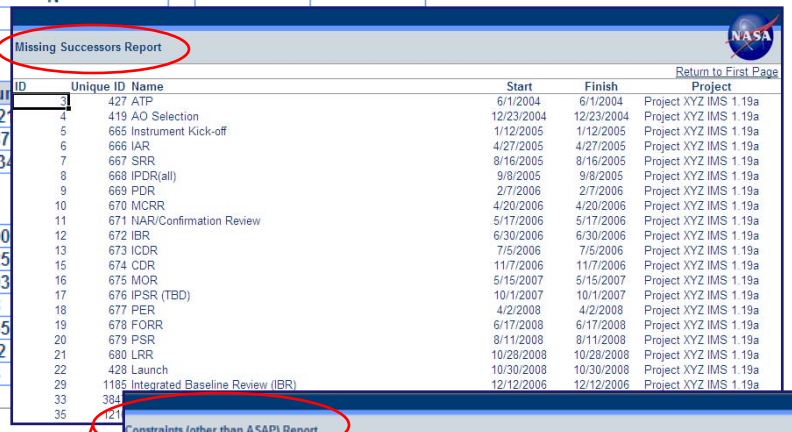
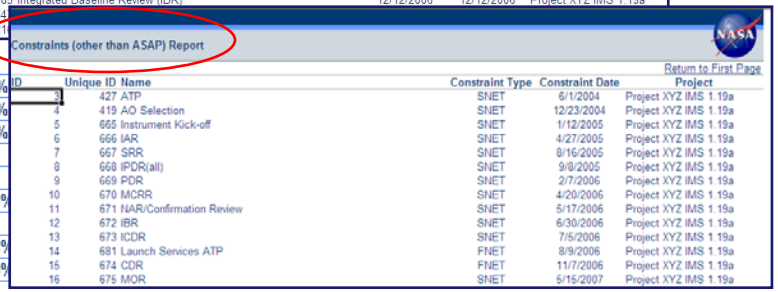

Missing Successors Report

Return to First Page

ID	Unique ID	Name	Start	Finish	Project
3	427	ATP	6/1/2004	6/1/2004	Project XYZ IMS 1.19a
4	419	AO Selection	12/23/2004	12/23/2004	Project XYZ IMS 1.19a
5	665	Instrument Kick-off	1/12/2005	1/12/2005	Project XYZ IMS 1.19a
6	666	IAR	4/27/2005	4/27/2005	Project XYZ IMS 1.19a
7	667	SRR	8/16/2005	8/16/2005	Project XYZ IMS 1.19a
8	668	IPDR(all)	9/8/2005	9/8/2005	Project XYZ IMS 1.19a
9	669	PDR	2/7/2006	2/7/2006	Project XYZ IMS 1.19a
10	670	MCRR	4/20/2006	4/20/2006	Project XYZ IMS 1.19a
11	671	NAR/Confirmation Review	5/17/2006	5/17/2006	Project XYZ IMS 1.19a
12	672	IBR	6/30/2006	6/30/2006	Project XYZ IMS 1.19a
13	673	ICDR	7/5/2006	7/5/2006	Project XYZ IMS 1.19a
15	674	CDR	11/7/2006	11/7/2006	Project XYZ IMS 1.19a
16	675	MOR	5/15/2007	5/15/2007	Project XYZ IMS 1.19a
17	676	IPSR (TBD)	10/1/2007	10/1/2007	Project XYZ IMS 1.19a
18	677	PER	4/2/2008	4/2/2008	Project XYZ IMS 1.19a
19	678	FORR	6/17/2008	6/17/2008	Project XYZ IMS 1.19a
20	679	PSR	8/11/2008	8/11/2008	Project XYZ IMS 1.19a
21	680	LRR	10/28/2008	10/28/2008	Project XYZ IMS 1.19a
22	428	Launch	10/30/2008	10/30/2008	Project XYZ IMS 1.19a
29	1185	Integrated Baseline Review (IBR)	12/12/2006	12/12/2006	Project XYZ IMS 1.19a
33	384				
35	121				


Constraints (other than ASAP) Report

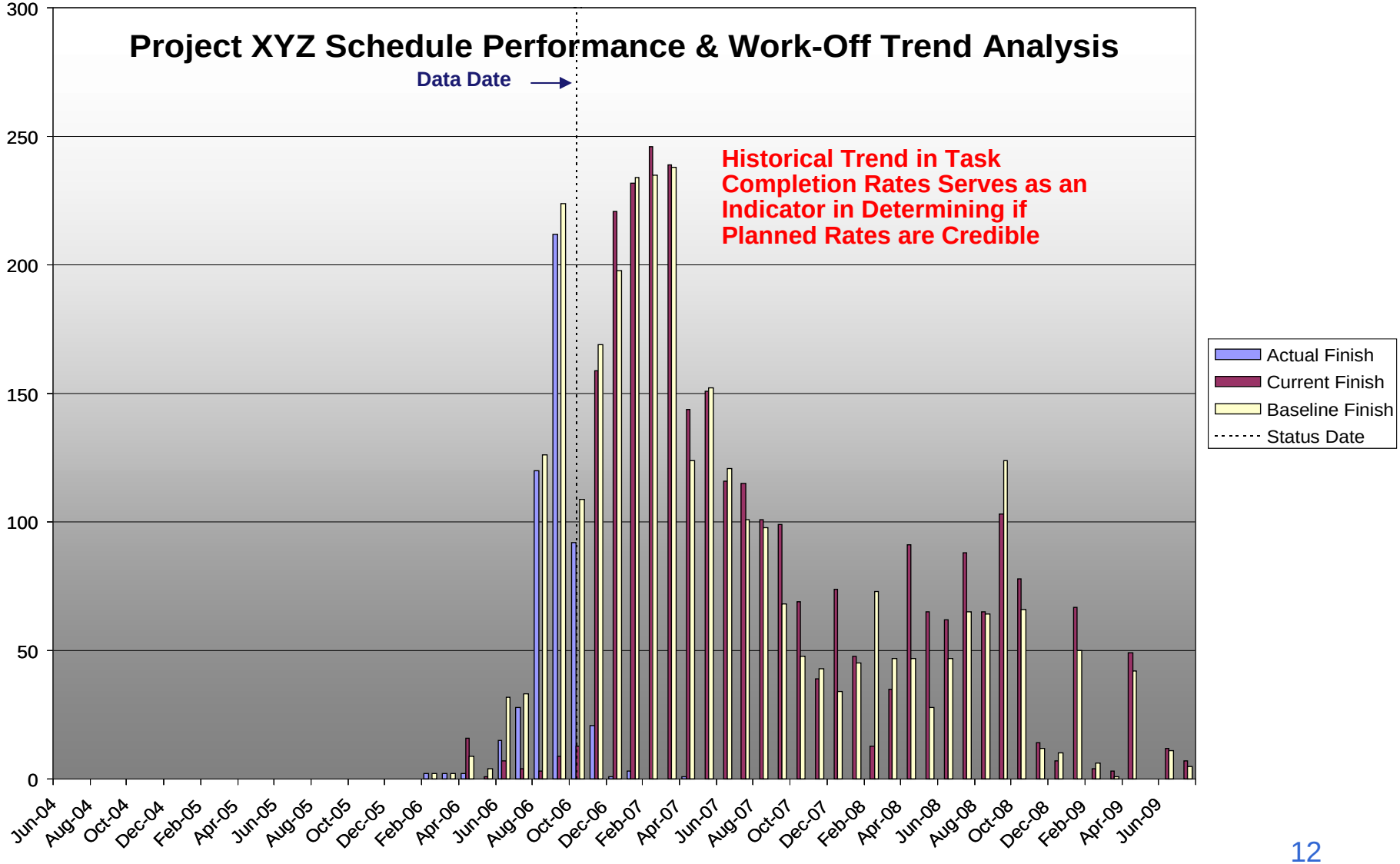
Return to First Page

ID	Unique ID	Name	Constraint Type	Constraint Date	Project
3	427	ATP	SNET	6/1/2004	Project XYZ IMS 1.19a
4	419	AO Selection	SNET	12/23/2004	Project XYZ IMS 1.19a
5	665	Instrument Kick-off	SNET	1/12/2005	Project XYZ IMS 1.19a
6	666	IAR	SNET	4/27/2005	Project XYZ IMS 1.19a
7	667	SRR	SNET	8/16/2005	Project XYZ IMS 1.19a
8	668	IPDR(all)	SNET	9/8/2005	Project XYZ IMS 1.19a
9	669	PDR	SNET	2/7/2006	Project XYZ IMS 1.19a
10	670	MCRR	SNET	4/20/2006	Project XYZ IMS 1.19a
11	671	NAR/Confirmation Review	SNET	5/17/2006	Project XYZ IMS 1.19a
12	672	IBR	SNET	6/30/2006	Project XYZ IMS 1.19a
13	673	ICDR	SNET	7/5/2006	Project XYZ IMS 1.19a
14	681	Launch Services ATP	FNET	8/9/2006	Project XYZ IMS 1.19a
15	674	CDR	FNET	11/7/2006	Project XYZ IMS 1.19a
16	675	MOR	SNET	5/15/2007	Project XYZ IMS 1.19a

Health Check | Missing Predecessors | Missing Successors | Constraints (other than ASAP) | Deadlines | Summaries with Logic Ties | E

Worksheet tabs provide the detailed findings for assessment and correction

Schedule Performance Trend



Schedule Assessment Summary Report

Overall Summary Rating

Schedule Assessment Summary Report

Project XYZ Master Schedule

Status As of Oct-06

Automated stoplight rating based on performance criteria and weighting

R

Criteria: Avg.of Weighted Support Rationale
R is <= 150 (50%),
Y is 175 - 225 (58% - 75%)
G is >=250 (83%)

Schedule Assessment Summary Comments

1. Too early in project to determine if req'd work-off rates are too optimistic.
2. Incomplete logic network indicates suspect schedule dates & critical path.
3. Key milestone slips did not reflect impact to Launch readiness date.

Y

User defined adjustment to the overall rating

Manual stoplight rating can be applied based on additional insights and information

Schedule Formulation and Integrity

Y

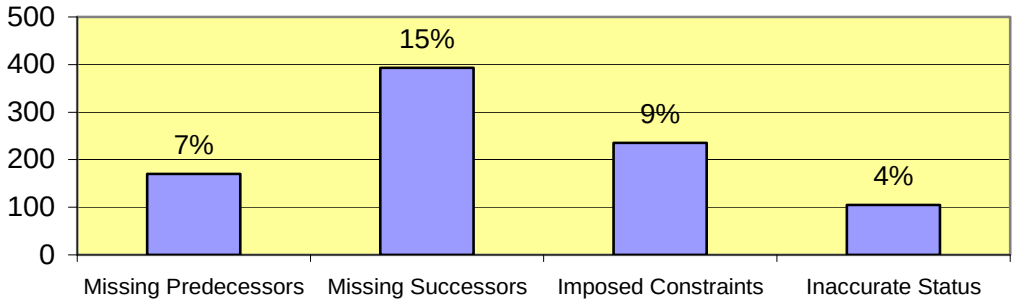
Schedule Formulation and Integrity: (Weighting 50%)

Criteria: (Health Matrix)
Matches Overall
Project Schedule Indicator

Scorecard Value:
100

Stoplight rating and data are from current Schedule Health Check

Key Schedule Formulation and Integrity Indicators



Based on 2556 to go tasks and milestones.

Schedule Assessment Summary Report

Schedule Performance Trend Data

R

Schedule Performance Trend: (Weighting 25%)

Criteria: Past 6 Months vs Next 6 Months

R is >20%

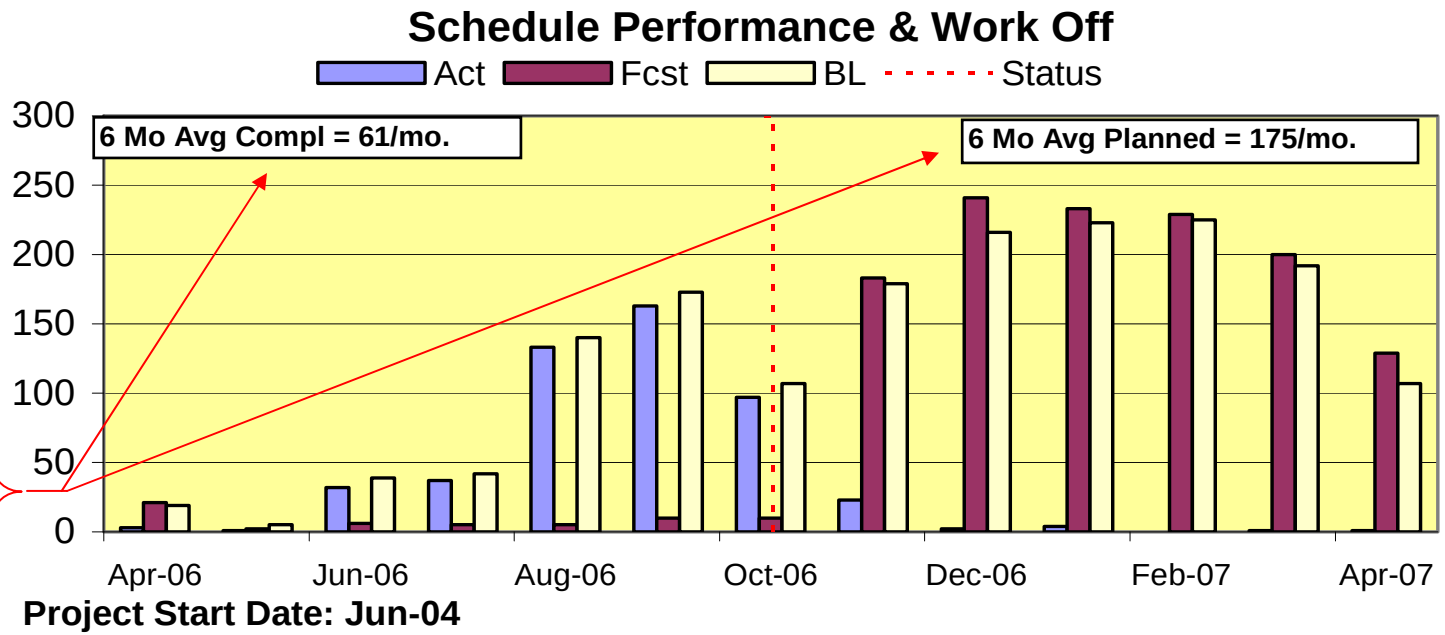
Y is 11-20%

G is <=10%

Scorecard Value:

25

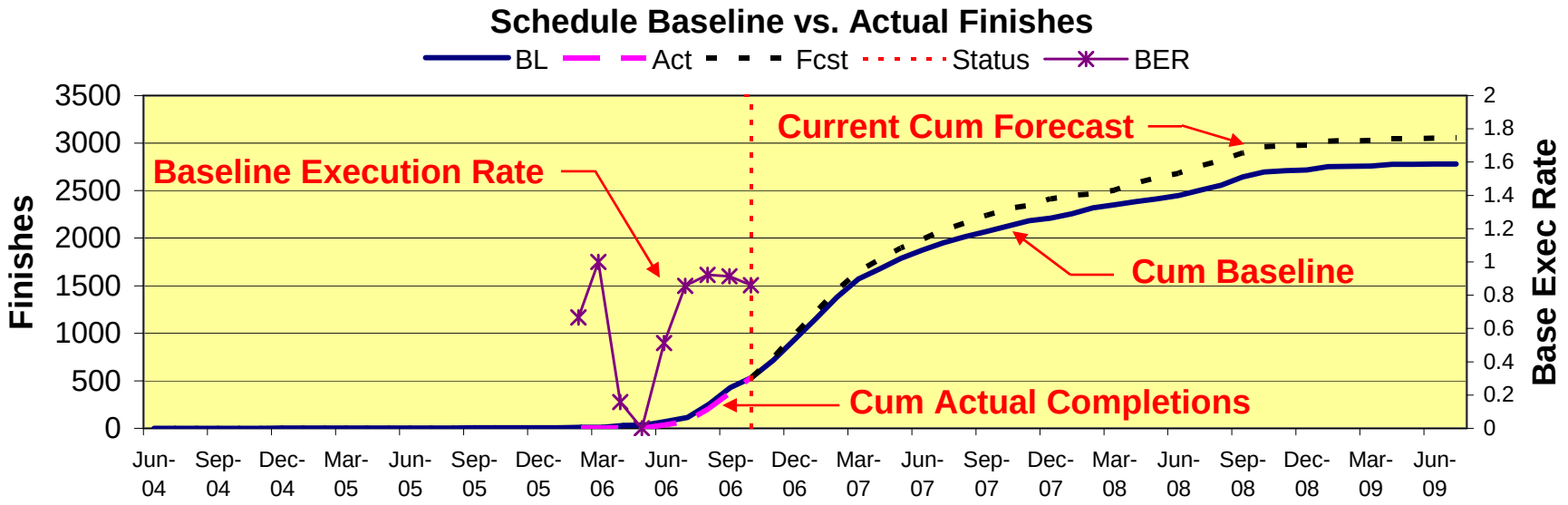
Historical Trend in Task Completion Rates Serves as an Indicator in Determining if Planned Rates are Credible



Note: Be sure to evaluate whether the numbers provide an accurate analysis

Schedule Assessment Summary Report

Baseline vs. Actual Finishes Analysis



BER = Monthly Baseline Plan Completed / Total Monthly Baseline Plan

(Note: BER = DoD "Hit or Miss" Tripwire)

Schedule Assessment Summary Report

Schedule Milestone Comparison

R

Schedule Milestone Comparison: (Weighting 25%)

Criteria:

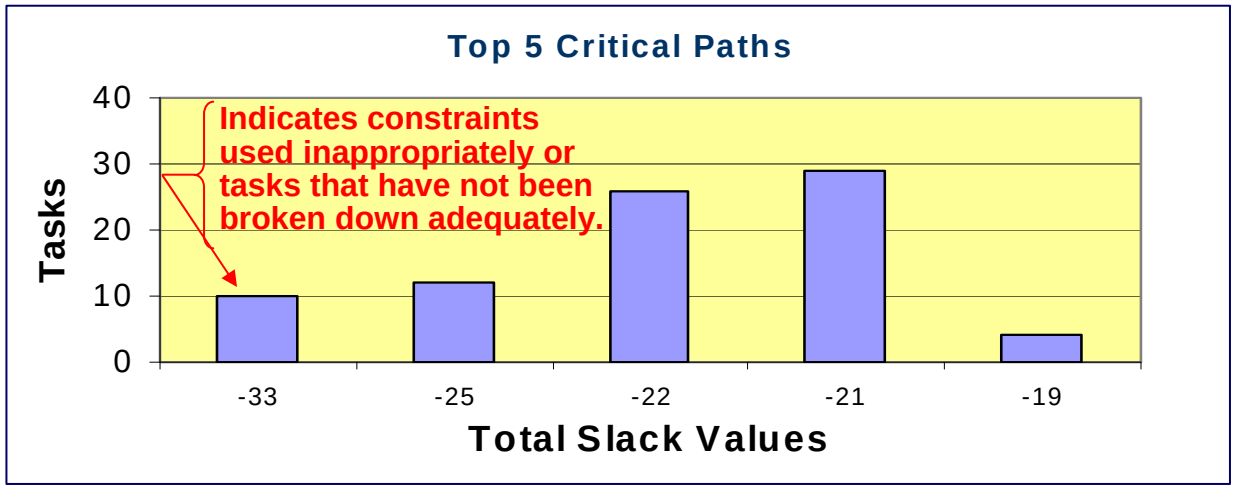
R is >= 20d
Y is 11-19d
G is <=10d

Scorecard Value:
25

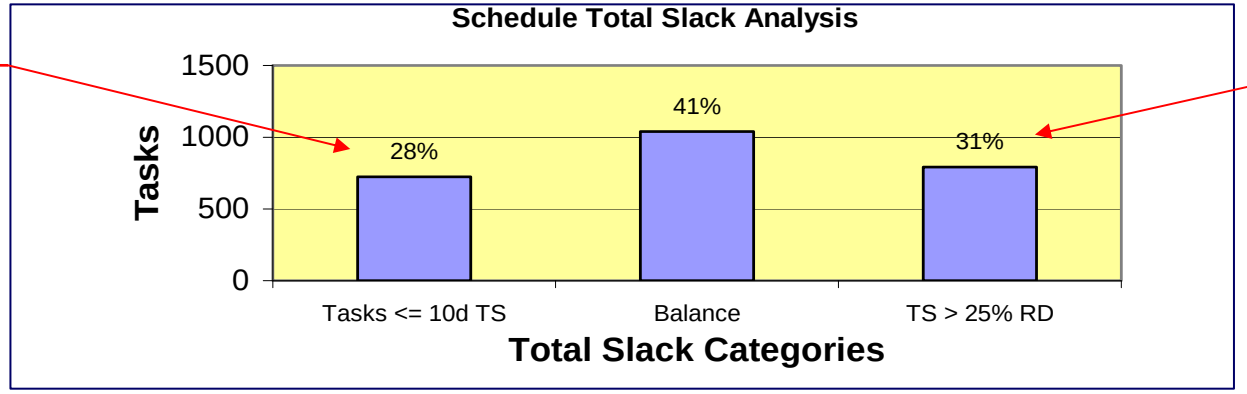
ID	WBS	DESCRIPTION	BASELINE	CURRENT	VARIANCE
26	0	Systems Requirements Review (SRR)	7/11/2006	7/11/2006	0
27	0	Preliminary Design Review (PDR)	9/8/2006	9/8/2006	0
30	**0**	**Critical Design Review (CDR)**	**2/20/2007**	**4/9/2007**	**35**
32	0	System Test Readiness Review (STRR)	10/15/2007	10/15/2007	0
33	**0**	**Space Vehicle I&T Start**	**9/18/2007**	**11/19/2007**	**45**
36	0	Space Vehicle I&T Complete (Sell off comp	8/28/2008	8/28/2008	0
38	0	Flight Readiness Review (FRR)	10/21/2008	10/22/2008	2
39	0	Launch Readiness Review (LRR)	10/27/2008	10/28/2008	2
40	0	Launch	10/28/2008	10/28/2008	0
Maximum Milestone Limit = 20					

NOTE: Key milestone slips are one indicator of unfavorable schedule performance that could impact project completion.

Schedule Assessment Summary Report



If this % is greater than 50% then the schedule is typically too optimistic and needs re-planning.

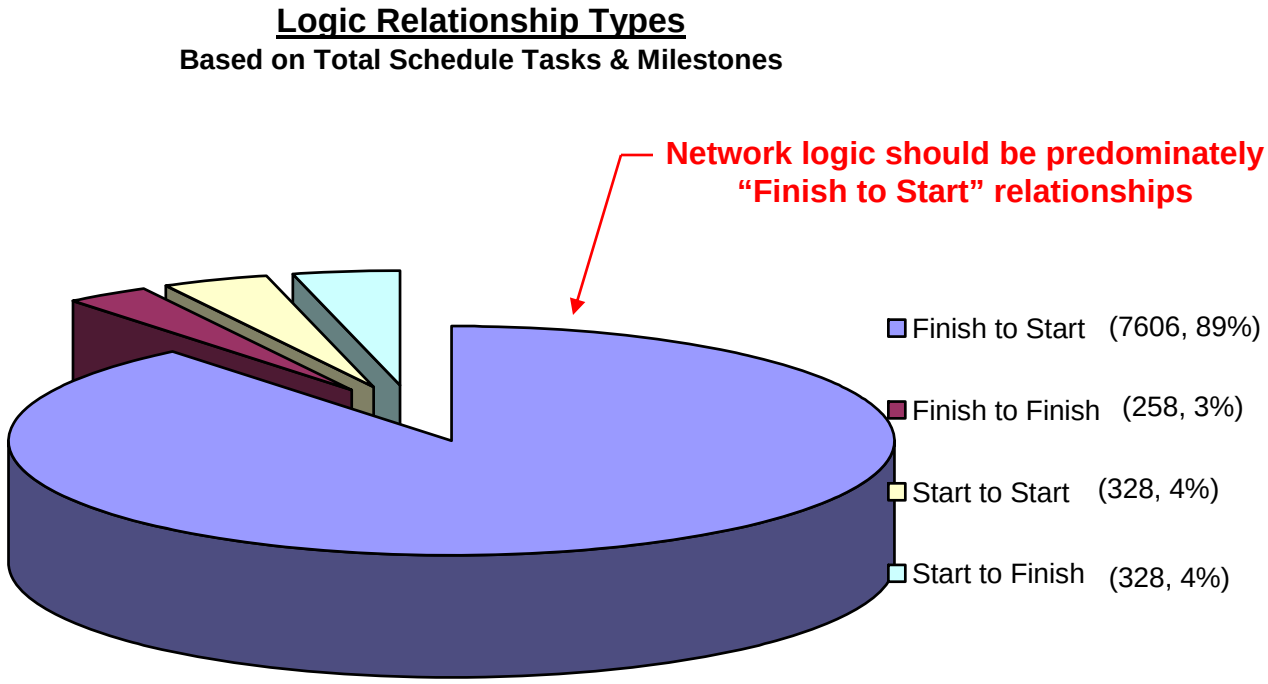


If this % is greater than 50% then tasks are probably not sequenced accurately

Caution: The above total Slack information is based solely on the project's IMS logic network (i.e.; predecessors, successors, constraints, etc.). Credibility of the data correlates directly to the quality reflected in the Schedule Health Check rating.

Schedule Assessment Summary Report

Logic Relationship Types



Total Relationships: 8520

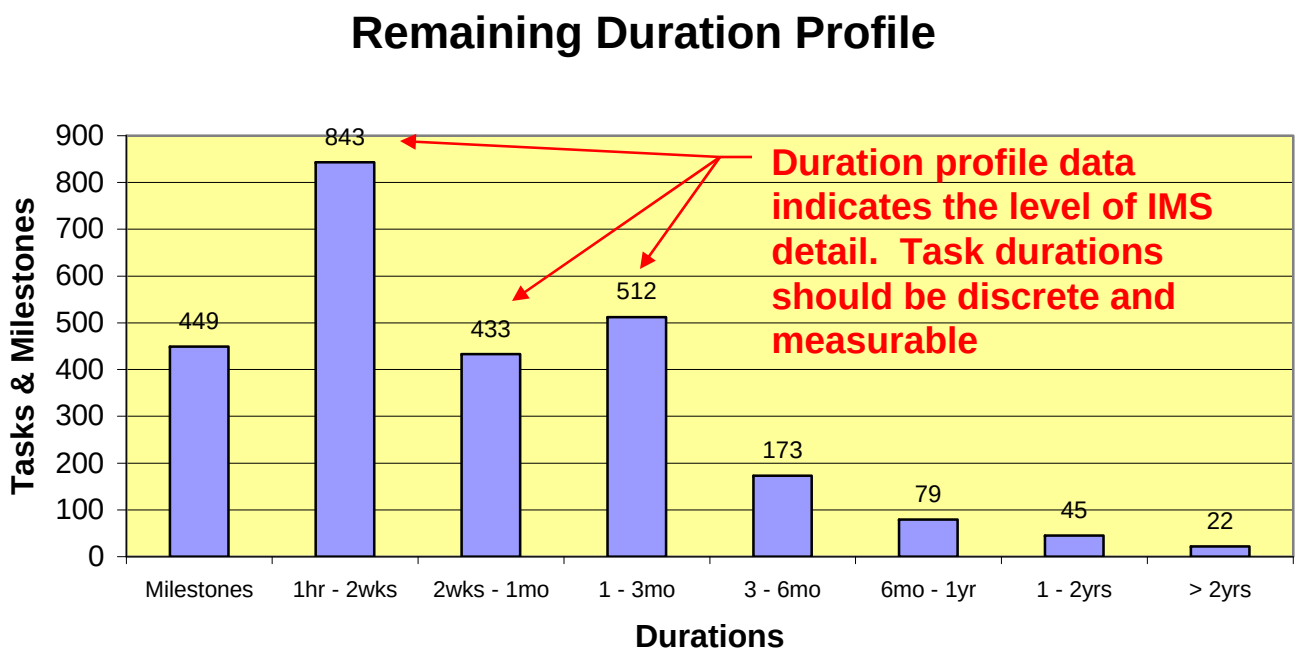
Total Tasks & Milestones: 3057

# of Relationships with Negative lags: 542 ← **Negative lags should be minimal**

Schedule Assessment Summary Report

Remaining Duration Profile

Remaining Duration Profile
Based on To Go Tasks & Milestones



Total Remaining Tasks: 2107

To Go Tasks & Milestones: 2556

Total Remaining Milestones: 449

Note: Summary tasks excluded

Schedule Assessment Summary Report

Management Overview Report (page 1)

Provides a format for brief analysis explanation for management reporting

Management Overview Report

Project: Project XYZ IMS 1.19a

Status As of Oct-06

NASA

R **Management Summary Comments**

1. Too early in project to determine if required work-off rates are too optimistic based on baseline plan vs. actual finishes to date.
2. Incomplete logic network indicates suspect schedule dates and critical path identification.
3. Key milestone slips did not reflect impact to Launch readiness date.

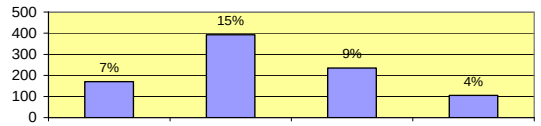
User defined adjustment to the overall rating: Y

Comments: The Schedule Performance & Work-off Trend should realistically be yellow. Not enough "actuals" history of sustained task completions to determine if future required rates are too optimistic.

Supporting Rationale:

Y **Schedule Formulation and Integrity: (Weighting 50%)**

Key Schedule Formulation and Integrity Indicators

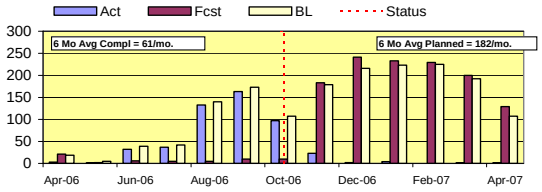


Based on 2556 to go tasks and milestones.

Comments: Yellow indicator reflects enough weaknesses in the logic network to make schedule data suspect. Incomplete task interdependency assignments along with invalid use of fixed task constraints and missing or incorrect task status significantly hinders the ability to identify the project critical path with a reasonable level of confidence. Sound "what-if" analysis is also hindered.

R **Schedule Performance Trend: (Weighting 25%)**

Schedule Performance & Work Off

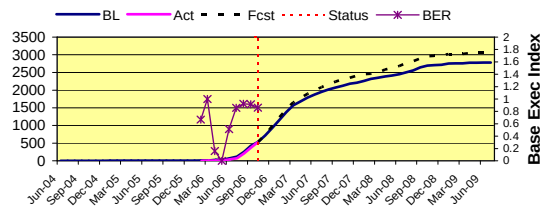


Project Start Date: Jun-04

Comments: While the rating indicator is currently red, it should be noted that based on baseline vs. actual completions to-date it is too early to determine if the projected task completion rates are realistically achievable. Therefore, it is recommended that the red performance indicator should be considered yellow to allow for 2 additional months of accomplishment data to be considered in the analysis.

Schedule Baseline vs. Actual Finishes Analysis

Schedule Baseline vs. Actual Finishes



Comments: The overall cum actuals to-date shows tracking reasonably well with the baseline plan. However, the the monthly baseline execution rates indicate that more management focus should placed on completing the right tasks.

Schedule Assessment Summary Report

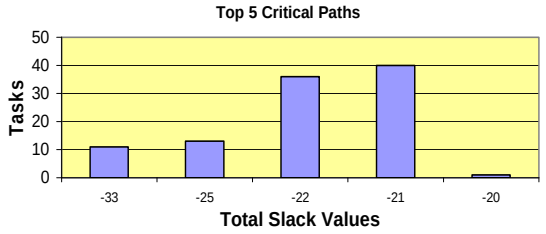
Management Overview Report (page 2)

R **Schedule Milestone Comparison: (Weighting 25%)**

ID	DESCRIPTION	BASELINE	CURRENT	VAR
30	Critical Design Review (CDR)	2/20/2007	4/9/2007	35
33	Space Vehicle I&T Start	9/18/2007	11/19/2007	45

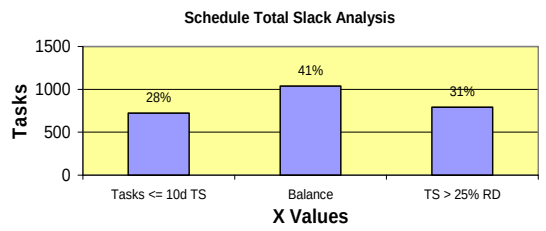
Comments:
Significant project milestones "CDR" & "Space Vehicle I&T Start" are each slipping approximately 2 months. These slips should realistically cause slips to "Launch Readiness Review" (LRR) and "Launch" dates, but the schedule does not reflect that. This is a further indication of significant interdependencies that have been ommitted or are incorrect. It is recommended that additional review and validation of task sequencing be accomplished by responsible planning and technical leads.

Critical Path Analysis



Comments:
The -33 day critical path which includes 11 tasks does not appear to be credible. Typically, the primary critical path will contain a larger number of task/milestones than the secondary low float paths. Secondary low float paths are usually spur paths which have some type of inter-dependency to the primary critical path and will not contain as many tasks. This is also another indication that too many date constraints have been assigned within the schedule or too many long duration tasks are on the Critical Path.

Schedule Total Slack Analysis



Comments:
This metric indicates a high percentage of tasks with high Total Slack values. This is a further indication that logic relationships are potentially incorrect or missing.

Miscellaneous Comments

The schedule should be reviewed and validated by appropriate planning and technical leads, with particular attention being paid to task and milestone sequencing and date constraints.

Demonstration